Bay Colony Rail Trail *Medfield Section*

Medfield, Massachusetts

Conceptual Planning & Design Report

Prepared For:
The Friends of Medfield Rail Trail

Prepared By:
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BEALS+THOMAS

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1.0 INTRODUCTION

The Medfield section of the Bay Colony Rail Trail (the "Trail") is a proposed shared-use trail following the route of the Massachusetts Bay Transportation Authority (MBTA) rail bed, running approximately 1.3 miles from Ice House Road to the Dover Town Line in Medfield, Massachusetts. The Trail could provide an excellent resource for residents. The proposed southernmost trailhead is located near The Center at Medfield, at One Ice House Road. The Center serves as the activity hub for the Council on Aging. Healthy activities can be promoted by The Center using the Trail. The Trail has the potential to connect residents to other sections of Town. While the Trail would be considered too short a length for most cyclists, it is a good length for new bike riders, walkers, and runners. Additionally, there is a direct connection with the Bay Circuit Trail, a regional hiking trail, offering users greater options and trail system experiences.

A significant amount of planning has already been performed by the Medfield Bay Colony Rail Trail Study Committee in a report dated December 2016. Beals and Thomas, Inc. (B+T), was contracted to build upon the original report and to advance the Trail planning to a conceptual level. The following sections of the report address the specific tasks identified in the contract.

B+T gathered data and performed multiple site visits to review the existing site conditions, develop a typical design cross-section, and recommend site improvements that may be needed. Topographic information from available sources was merged with MassGIS information and the Railroad Valuation maps into an AutoCAD format that was used for the conceptual design plans. A trail cross-section was developed considering the site conditions, the anticipated funding, and the methods of construction.

In general, we find that this section of trail is relatively easy to develop when compared with other rail trails that are planned or constructed across the region for the following reasons:

- There are no bridges that are required.
- The existing drainage structures and ditches are in good condition.
- There is minimal visibility to the Trail from abutting properties.
- There are only two at-grade street crossings.
- Minimal encroachments or dumping activities exist along the corridor.
- The development costs can be kept low with volunteer assistance or potentially by support of Town departments.

The following sections address the specific tasks within the contract:

2.0 REPORT SECTIONS

2.1 Parking and Access

2.1.1 General Parking Considerations

The Trail, as planned with only 1.3 miles in length, is not of sufficient length to be considered a regional draw for people who typically frequent rail trails as tourists. The shorter length, however, will be mainly used by walkers and runners from the immediate area. A trail of this length will provide an opportunity for young bicyclists to learn to ride in a safe environment. Parking, therefore, can be limited to a smaller lot. We typically recommend that, in a suburban area, a regional trail would need to provide about 50 spaces per mile. We recommend constructing a smaller facility of about 20 to 30 spaces and provide overflow parking for larger events. Alternatively, arrangements with other public and private facilities for overflow parking for specific events may be considered.

2.1.2 Ice House Road Parking Area

The area of Ice House Road, specifically the right of way parallel to West Mill Street, has sufficient space to accommodate at least 75 parking spaces. Access from Ice House Road is preferred over access from Harding Street due to the configuration of the intersection at West Mill Street. The railroad right of way of the main section of the corridor near Ice House Road is wide enough to allow for efficient parking layout. The site plans depict a parking lot and entry area in this location, initially planned for approximately 25 spaces. The parking area may be expanded in the future if the Trail becomes part of a larger regional trail network or if daily usage significantly increases.

2.1.3 Farm Street Parking Area

The railroad right of way in the area of Farm Street is approximately 59 feet wide. This width is not sufficient to provide a separate off-street parking area and trail. We do not recommend on-street parking along Farm Street due to its alignment and width. There is an unofficial gravel parking area; however, this area is located on land owned by the American Telephone and Telegraph Company (AT&T), which has an underground cable in the vicinity. The AT&T right of way runs parallel to the Trail, and is approximately 70 feet wide. If parking is desired in this area, AT&T could be approached for a parking easement.

2.2 At-grade crossings

2.2.1 Sight Distances

The proposed rail trail crosses two streets, Farm Street and Harding Street. Stopping sight distances from the vehicles approaching the crossing were evaluated and measured in the field. The stopping sight distances were determined based on American Association of State Highway and Transportation Officials (AASHTO) standards. Corrections for slope were made to establish the minimum recommended stopping sight distance. The posted speed limit in both directions at the Harding Street intersection is 25 miles per hour. There is a down-gradient slope toward the intersections when approaching from the west.

The posted speed limit at the Farm Street intersection is 30 miles per hour. The speed of travel at the Farm Street intersection is currently low due to the poor condition of the rails and ties at the crossing. The poor condition effectively slows down vehicles at the immediate crossing. However, when the crossing is improved to remove the rails and ties and thus provide a smoother surface, vehicles will likely speed up.

All approaches to the intersections provide acceptable stopping sight distances. Vegetation was not present on the deciduous shrubs at the time of the measurements at Harding Street. One shrub at the Harding Street intersection may require trimming after re-evaluation in full-leaf conditions. Table 1 summarizes the stopping sight distance findings.

Photograph 1. View from crossing looking northwesterly along Harding Street.

Photograph 2. View from crossing looking southeasterly along Harding Street. Shrubs beyond hydrant may reduce the view in full-leaf conditions.

Photograph 3. View from crossing looking westerly along Farm Street.

Photograph 4. View from crossing looking westerly along Farm Street.

Intersection Crossing	Posted Speed Limit (mph)	AASHTO Required Minimum Stopping Sight Distance* (feet)	Available Stopping Sight Distance (feet)	Comment
Harding Street				
Driving Southeasterly	25	165*	300	Suitable to 35+ mph
Driving Northwesterly	25	155	310	Suitable to 40+ mph**
Farm Street				
Driving Easterly	30	215*	330	Suitable to 35+ mph
Driving Westerly	30	200	330	Suitable to 40+ mph

* Adjusted for Grade
** May require vegetation cutting

Table 1. Sight Distance Measurements

2.2.2 Intersection Design

The two at-grade crossings of the proposed rail trail at Farm Street and Harding Street would not meet the warrants for a signalized crossing due to the low number of anticipated users. We do recommend that both crossings be designed with advanced warning signage and Rectangular Rapid Flashing Beacons (RRFB). The rail trail users will have a stop condition at the crossing; they will be directed to use the push button to activate the flashing beacons and to cross when safe to do so. See Sheet 10 in Appendix A for a conceptual design for the intersections.

2.3 Wetland Resource Areas

2.3.1 Wetland Observations

A site visit to reconnoiter sections of the trail route that have MassGIS-depicted wetlands or streams was undertaken on March 13, 2017. The former rail line contains a generally intact track system with wood railroad ties, steel rails, and stone ballast. A large portion of the former rail line is unvegetated, although vegetation is growing through the stone ballast and adjacent sloped banks along certain portions of the trail route.

Wetland and stream locations were generally consistent with MassGIS with the exception of the wetland system located to the northeast of Harding Street. MassGIS depicts Bordering Vegetated Wetland (BVW) on both sides of the tracks with two hydrologic connections that traverse beneath the rail bed. The areas of BVW are generally consistent with MassGIS depictions, however the northern hydrologic connection was not observed in the field. Rather, the two wetland systems on the east side of the rail bed are connected via a well-defined stream channel that runs parallel to the rail bed and flows in a southerly direction. At the time of the site visit, the outlet from the northern section of BVW had been apparently dammed by beavers causing ponding within the BVW and significantly reducing flow within the channel.

The southern hydrologic connection is present as depicted by MassGIS and consists of a stone box culvert located beneath the rail bed. A large stone block, grate, and cage device was observed on the western end of the box culvert that may have been installed to prevent beaver passage.

Photograph 5. View of beaver dam and beginning of stream channel at southern extent of BVW, east of rail bed.

Photograph 6. View of western end of box culvert with apparent beaver device.

With the exception of Riverfront Area (RFA) and Bordering Land Subject to Flooding (BLSF), no resource areas were observed within the former rail line, although resource areas are present within 100 feet of and immediately adjacent to the former rail line in specific areas. RFA extends 200 feet from Mill Brook as well as other mapped perennial streams that cross the route via existing culverts. Other resource areas observed proximate to the trail route include Bordering Vegetated Wetland (BVW), Bank, and Land Under Water Bodies and Waterways (LUWW). A 100-foot buffer zone extends from BVW and Bank.

In addition to these state-jurisdictional resource areas, the Town of Medfield Wetlands Protection Bylaw also protects: "any freshwater wetland, certifiable vernal pools, and within 100 feet of any land subject to flooding or inundation, or within 100 feet of the one hundred year storm line". An Isolated Vegetated Wetland (IVW), which could be defined as "any freshwater wetland", is located on the eastern side of the rail bed, north of Railroad Centerline Station 820+00. The IVW is consistent with MassGIS depictions and contained standing water during the site visit. Although no certified or potential Vernal Pools are mapped proximate to the rail bed, they may be present in wetlands within 100 feet of the former rail bed, particularly in flooded areas such as the ponded area east of the section of rail bed located north of Harding Street.

Portions of BVW contained open water associated with beaver activity while other areas contained hummocks that rose above the shallow marsh. Vegetation within these areas generally consisted of red maple saplings (*Acer rubrum*), cattails (*Typha spp.*) and various sedges (*Carex spp.*), rushes (*Juncus spp*), and sphagnum moss (*Sphagnum spp.*). BVW observed within forested areas generally consisted of a typical red maple swamp community, including high bush blueberry (*Vaccinium corymbosum*), northern arrowwood (*Viburnum dentatum*), speckled alder (Alnus incana), sensitive fern (*Onoclea sensibilis*), poison ivy (*Toxicondendron radicans*), cinnamon fern (Osmunda cinnamomea), and sphagnum moss.

Photograph 7. View of BVW containing red maple saplings and vegetated hummocks.

Photograph 8. Looking east across railroad tracks at area of open water above beaver dam.

The rail bed and adjacent upland slopes are dominated by white pine (*Pinus strobus*), spruce (*Picea spp.*), and northern red oak (*Quercus rubra*) along with scattered gray birch (*Betula populifolia*) and red cedar (*Juniperus virginiana*).

Invasive species observed within and adjacent to the portions of the former rail line reconnoitered include bittersweet (*Celastrus orbiculata*), glossy buckthorn (*Rhamnus frangula*), and a section of Japanese knotweed (*Fallopia japonica*) in proximity to the existing "at-grade crossing."

2.3.2 Regulatory Considerations

With Conservation Commission concurrence, it may be appropriate to permit the construction of the Trail through a Determination of Applicability process. Proposed work will occur entirely within the existing rail bed and no work is proposed within resource areas, with the exception of previously disturbed RFA and BLSF. It is recommended to confirm the permitting approach with the Commission prior to submittal.

Given the location and disturbed nature of the proposed route, it is anticipated to be feasible to construct the Trail without direct impacts to BVW, Bank, LUWW, or IVW resource areas that are adjacent to the route. Furthermore, in areas where the proposed trail lies within RFA, the streams are already crossed by existing culverts. The proposed work may qualify as redevelopment of previously developed RFA if measures to improve existing conditions are included and, even if not undertaken as redevelopment, the proposed work is not anticipated to significantly alter the character of the RFA.

Additionally, if Vernal Pools are present within 100 feet of the proposed route, the conversion of the former rail bed to a stone dust trail will not impair their capacity to function, including allowing migration of animals to and from the pools. Given the existing disturbed and previously developed nature of the rail bed and the anticipated insignificant change in character from the existing rail bed to the proposed trail, it is anticipated that there will be no adverse impacts on vernal pool habitat that may be located in the vicinity of the proposed route.

The FEMA Maps showing the rail corridor include maps 25021C0154E and 25021C0158E. A small section of the rail bed northeast of Harding Street is located within floodplain (BLSF). There is no defined floodplain elevation based on information from FEMA. The typical trail cross-section depicts the grade of the rail bed both before and after construction. Generally, the surface of the ground following the removal of the rails and ties will be approximately four inches lower than the current surface elevation. This is due to the volume of rails and ties that exist in the cross-section. Depending on the final selected depths of imported gravel base and stone dust, the final elevation will be slightly above the current existing grade. For that reason, the "typical" cross-section of the Trail within floodplain may reduce the volume of flood storage. The design in those areas may want to consider either reducing the gravel base thickness or, alternatively, grade the ballast surface so that there will be no decrease in flood storage. By incorporating the previously aforementioned measures for constrained areas, the work will meet the applicable state and local performance standards for BLSF.

Although some of the work within the 100-foot buffer zone will occur in close proximity to resource areas, the work is not anticipated to adversely affect soil stabilization, wildlife habitat cover, shading, or other contributions of the buffer zone to these resource areas. The stone ballast used in the railroad corridor does not constitute an erodible soil, and the duration of the construction of the Trail is relatively short. Conservation Commissions in other municipalities have recognized these facts and allowed construction to proceed with erosion controls only where necessary to protect resource areas. We recommend that erosion controls along the full extent of the resource areas are not necessary to protect those resources, and have indicated our recommended locations on the conceptual design plans.

Finally, the Medfield Wetlands Bylaw contains a "50-foot no-disturb area" from the edge of resource areas and states "an applicant, proposing to disturb any area within such 50-foot area shall have the burden of showing that the work proposed in the application will not harm the interests protected by the Bylaw, the MA WPA, and the DEP wetlands regulations." Given the existing disturbed nature of the rail bed and minimal impacts of the proposed work, we presume the project will not harm the protected interests mentioned herein and that the Commission has the ability to waive this provision and allow work within the no-disturb area.

It will be necessary to demonstrate compliance with state and local performance standards in the filing(s) with the Conservation Commission and, as previously noted, coordination with the Conservation Commission to confirm the preferred permitting approach and the extent and type of erosion controls that are required.

2.4 Drainage conditions

In general, the railroad surface is in excellent condition with no major concerns regarding drainage at the surface level. Typically, the drainage channels along a railbed become constricted due to lack of maintenance. The drainage ditches in this section of the railbed are in good condition, with only minor amounts of dumped debris or leaf litter.

The drainage culverts are also in good condition. A minor amount of material is evident on the north side of the 21-inch corrugated metal pipe at Station 784+83 (550+/- feet north of Farm Street). This material can be removed by hand without much effort.

The stone box culvert located at Station 831+52 (250+/- feet north of Harding Street) appears to be compromised by metal grates and a granite block. The flow through the structure may be impeded by the material. It is recommended that this structure be repaired to maintain the intended flow through the structure.

Valuation Map Station	Structure	Condition	Notes	Action Needed
784+83	2.5' x 3' stone box; extension on north side with steel pipe	Minor cleaning	21-inch diameter corrugated metal pipe on north side; stone on south side	Minor cleaning on north side
802+47	2' x 2' stone box on Valuation Map, 24-inch corrugated metal pipe	Clear	No flow evident	None
831+52	2' x 3.5' stone box culvert	Blocked on north side with metal grates and large granite block	Flow may be restricted by blockage, resulting in potential flood conditions	Reconstruct inlet on North Side

Table 2. Cross-Culvert Conditions

2.5 Abutter concerns

The corridor is relatively clean with no evidence of graffiti. There is only a minor amount of dumping at various locations. Material identified included a couch, tires, and yard waste. There are areas with a canopy of large pine trees that appear to have been cut to provide more sunlight to the abutter's property to the northwest of the railbed. There are relatively few houses with winter visibility from the railbed, and most are of sufficient distance with existing vegetation or fencing in the backyards. Many of these houses are set higher than the grade of the railbed, therefore visual buffers within the right of way will not provide effective screening until the plants are more mature. Plantings closer to the residences would provide a more effective visual buffer. Areas of suggested visual buffering for the areas with some visibility are shown on the Concept Plans in Appendix A. Estimated costs for the buffers are included in the Cost Estimate in Appendix D.

2.6 Right of Way Concerns

The width of the rail corridor was dimensioned on the original railroad Valuation Maps. The original width of the corridor was primarily 82.5 feet, with some widenings to 100 feet. Near Farm Street, as shown on the original Valuation Map, the width of the right of way was 152.5 feet. Sections of the right of way, however, were later reduced in width with the sale of parcels. Near Farm Street, the right of way was sold to AT&T. The resulting width is 59.5 feet.

The construction of the proposed Trail is not constrained by these narrowings since there will be adequate width for construction of the Trail and for fall barriers.

A Shell Oil cross easement exists near Ice House Road. Although it is not expected to constrain any of the proposed work associated with the Trail and parking, the gas pipeline will need to be taken into consideration prior to any construction in this area.

2.7 Soil Contamination

2.7.1 Key Findings

- Based on the findings of our research, there are minimal documented sources of contamination along the corridor.

- Based on a review of the Valuation Maps, there are two confirmed battery vaults located along the proposed trail route and four potential battery vaults. The Valuation Maps depict two switches near Ice House Road and Harding Street, the former station, a railroad bumper stop, and an additional depot building.

- Recommended protocols for soil sampling include collection of regularly spaced composite samples along the length of the rail trail corridor as well as additional samples collected adjacent to former buildings and switches. Recommended sampling parameters include arsenic, lead, and polycyclic aromatic hydrocarbons. This option entails a higher cost.

- Due to the corridor's location in historically residential, rural, and significant areas of undeveloped land, a reduced sampling program could be considered.

- We recommended trail design and development follow MassDEP's Best Management Practices for Controlling Exposure to Soil during the Development of Rail Trails.

2.7.2 Introduction

The purpose of this section is to identify potential contamination issues within or in close proximity to the project corridor.

Contamination along a former rail corridor is typically the result of either residual contamination from railroad operations or contamination associated with adjacent uses along the corridor.

The most common contamination found along a rail corridor is residual contamination from railroad operations. According to the Rails-to-Trail Conservancy's study on "Understanding Environmental Contaminants" (October 2004), the most commonly reported contaminants along rail corridors include arsenic, which was used as a herbicide to control weeds, metals, and constituents of oil or fuel (petroleum products), which likely dripped from the rail cars as they passed over the corridor. Coal ash is also considered residual contamination. In addition, any existing railroad ties along a corridor were likely treated with creosote and therefore need to be removed and transported in accordance with local, state, and federal hazardous waste disposal requirements.

There is also the possibility that historic uses of adjacent properties may have resulted in contamination along the corridor. Such histories could include improper disposal actions along the rail corridor or a release of oil or hazardous material on an adjacent site.

2.7.3 Bay Colony Rail Trail Study Report

The Medfield Bay Colony Rail Trail Study Committee prepared a report entitled "Bay Colony Rail Trail Study Report," dated December 11, 2016, in which the Committee evaluated environmental contamination and liability.

The report reviewed the history of the proposed trail route and identified an ice house, a saw mill, and the railroad station on West Mill Street as industrial activities along the route. In addition, a petroleum product pipeline owned by Shell Oil and operated from the 1940s to 2000 crosses the proposed trail route at Ice House Road and West Mill Street. The report notes that there were no identified leaks from the pipeline in the vicinity of West Mill Street, although two leaks in the vicinity of Hospital Road and St. Edward's Church occurred approximately 25 years ago.

The report did not identify any Chapter 21E Superfund sites in Medfield in the vicinity of the proposed trail route. The report identified one release reportable to MassDEP under the Massachusetts Contingency Plan (MCP) in Medfield in the vicinity of the proposed trail route. The MCP (310 CMR 40.0000) is the set of regulations that governs the reporting, assessment, and cleanup of oil and hazardous material spills in Massachusetts.

The report concludes that "the Study Committee did not find evidence of any past activities on or near the railroad corridor that raised concerns about abnormally high levels of contamination," with the exception of isolated dumping of yard and household waste (e.g., paint) by abutters. The report further notes that these issues can be addressed through application of best management practices for converting former rail lines to trails.

2.7.4 Additional Research

On February 23, 2017, Beals and Thomas reviewed the MassDEP Waste Site/Reportable Release Look Up and Release Lists for the Town of Medfield. We reviewed one release in the vicinity of the proposed trail route that had previously been identified by the Medfield Bay Colony Rail Trail Study Committee:

- Medfield State Hospital Tubular Well, Colonial Drive, RTN 2-3004125: No files were available for this release. According to the Site Information page for the site, an unspecified amount of petroleum from an unspecified source was released on January 15, 1993. A Response Action Outcome (RAO) statement was submitted on August 31, 1998, and closure was achieved. The site is identified as a Class

A2 RAO, indicating that the source of contamination was addressed and a condition of "no significant risk" exists, but contamination was not reduced to background.

According to MassGIS, there are no underground storage tanks, Solid Waste Land Disposal sites, or Bureau of Waste Prevention Major Facilities within the general vicinity of the proposed trail route.

2.7.5 Recommended Testing

MassDEP Best Management Practices at Rail Trail Conversions employ a decision tree (see Figure 1) for assessing when testing is recommended. Visual inspection of the site did not identify obvious signs of contamination. To better understand the potential for contaminants to exist within the railbed, we recommend a limited testing program that samples the soils at various intervals in the corridor and at former switch locations.

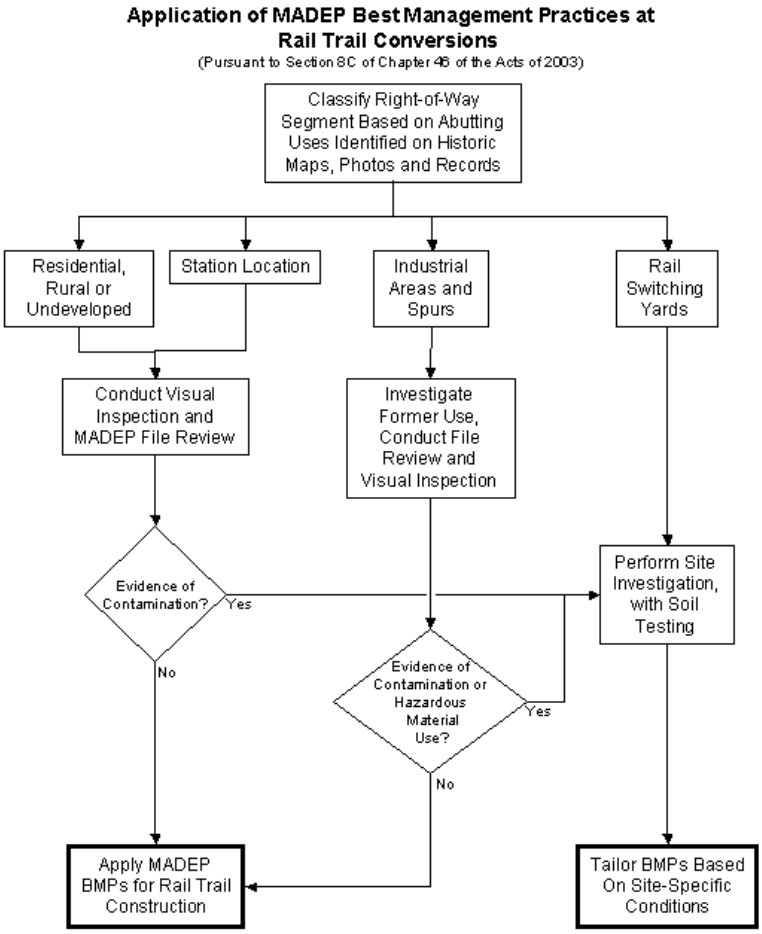


Figure 1: MassDEP BMP Decision Tree

The following discusses the recommended program:

Sampling protocols developed by CSX Transportation include a testing program through the overall corridor using composite sampling methods. Additional testing is recommended at switch locations, platforms, train stations, and where buildings are located or may have previously been located within the corridor. The following, and Appendix C, is taken from that recommended testing protocol.

Following the "Minimum Sampling, Soil Management, and Capping Requirements for Rails-to-Trails Conversion of Rail Corridors" for rail corridors greater than 1 mile in length, included as Appendix C, composite samples should be calculated using the following formula:

- Number of Composite Samples = 20 + 5x, where x = total corridor length in excess of 1 mile

The total length of the proposed trail route in Medfield is approximately 1.3 miles. Therefore, based on this protocol, 22 composite soil samples should be collected along the corridor approximately every 300 feet. Composite samples should consist of 5 samples evenly spaced over each 300-foot interval, taken from the upper 6 inches of soil.

In addition to the above-noted samples collected along the length of the corridor, an additional sample should be collected from the area adjacent to the former station near Farm Street, the depot near Harding Street, near the railroad bumper stop between Harding Street and Ice House Road, and the six confirmed or potential battery boxes as depicted on the Valuation Maps. Finally, three composite samples should be collected from each of the two switches near Harding Street and Ice House Road.

Thus, the total estimated sampling quantity is 37 samples.

The following parameters are recommended for testing:

- Arsenic
- Lead
- Polycyclic Aromatic Hydrocarbons (PAH)

2.7.6 Coal Ash

A recent concern across the state has been the presence of coal ash along former railroad corridors. Coal ash is residual contamination from former railroad operations. This by-product is exempt from the MCP.

While it is acceptable to both leave and re-use soil containing coal ash along a corridor, the MassDEP's antidegradation policy restricts off-site reuse to a similar setting. Consequently, leftover materials may need to be transported to an approved landfill at additional costs to the Contractor, which ultimately increases the overall cost of the Trail project to the Town. It is therefore important for the Trail design to balance cut and fill volumes to minimize any transportation of material off-site. We recommend following a plan to minimize cut within the corridor and instead use the gravel and stone dust as fill over the existing grade to the maximum extent possible with no soil material to be removed from the site.

2.7.7 Design Implications

We recommend the proposed trail design and development conform to MassDEP's Best Management Practices for Controlling Exposure to Soil during the Development of Rail Trails. Our proposed design recommendations are based on BMPs.

These BMPs were developed by MassDEP to eliminate or minimize potential exposures to residual oil or hazardous materials commonly found along railroad rights of way being converted to rail trails. MassDEP notes that these BMPs by themselves are insufficient without more extensive site investigation in industrial areas with known or likely non-railroad sources or in rail yards. As a result, the purpose of additional sampling using the CSX sampling method is:

1. To identify potential areas of contamination that exceed residual levels and that require more extensive environmental remediation before trail development

2. Rule out areas with no contamination or residual contamination levels in order to tailor the application of BMPs to site-specific conditions

It should be noted that the rail trail construction would not introduce any hazardous waste or contaminated materials to the project area. Design plans and specifications should contain spill prevention plans and protocols, EPA standards, and contain specific BMPs from the MassDEP Best Management Practices for Controlling Exposure to Soil during the Development of Rail Trails.

2.8 Cost Estimate

Costs for implementing rail trail projects vary greatly depending on various factors, including the need for soft costs like design and permitting, the availability of volunteer labor and donated materials, local labor costs for contracted labor, and market prices for salvaging rails. Local agencies like the Department of Public Works may also be able to supply materials, such as reclaimed asphalt or gravel, at a much lower unit cost than through private contractors. These agencies could supply labor and town-owned machinery to help reduce the cost of implementing the project. Actual hard and soft costs will depend on the Town's design and implementation preferences. Considering this variability in cost, we will present alternative cost estimates and the assumptions underlying each estimate.

The Town should also consider maintenance costs over time, such as cleaning out culverts, trimming vegetation, removing material dumped by abutters, repairing surface conditions, and replacing decking and handrails. Costs for maintenance of surfaces for 10 years are included in the estimates.

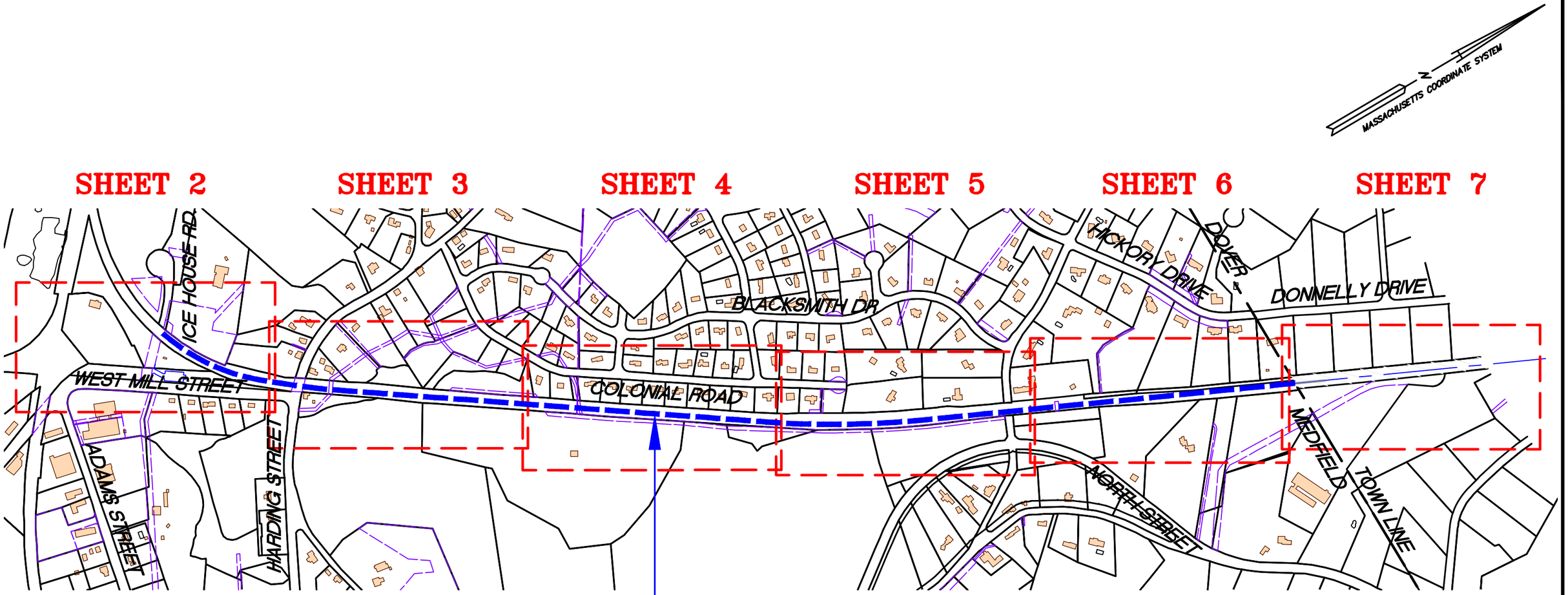
The cost estimate does not assume phasing costs. The soft costs, if phased, can increase considerably. In addition, materials costs typically increase over time, affecting the total costs.

The costs do not consider grants, donations, and other sources to reduce the overall costs. For example, under the Massachusetts Department of Conservation and Recreation's Recreational Trails Program (RTP), funding can be provided for 80 percent of the costs for the trail-specific construction. The Town could use volunteer or donated labor and equipment as part of the 20 percent match. This can significantly reduce the costs to the Town for the implementation of the project. As observed on other trail projects, significant volunteerism results in further cost reductions as sections of the Trail are constructed and that these individuals and groups want to contribute to the full implementation of the project.

Appendices

Appendix A

Concept Plans



LEGEND

124	EXISTING CONTOUR
	EDGE OF WATER
	APPROXIMATE BOUNDARY OF BORDERING VEGETATED WETLAND
	EXISTING BUILDING
Ⓦ	WHISTLE POST
R.R.	RAILROAD
STA.=	CENTERLINE STATION
TEL. BOX	TELEPHONE BOX
N/F	NOW OR FORMERLY
	VISUAL BUFFER
	FALL BARRIER
	100 YEAR FLOOD LINE
	PROPOSED 10' WIDE TRAIL
	EROSION CONTROL BARRIER (ECB)

METERS
0 100 250 500
0 300 600 1200 1800
FEET

CONCEPTUAL DESIGN PLAN

BAY COLONY RAIL TRAIL
MEDFIELD SECTION
MEDFIELD, MASSACHUSETTS

Scale: 1"=600' Date: 04/20/2017

B+T JOB NO. 2866.00 B+T PLAN NO. 286600P002A-001

1

BEALS AND THOMAS, INC.

ICE HOUSE RD

MILL BROOK

SEE DETAIL ON SHEET 8

R.R. CENTERLINE STA.=840+00

KIOSK

PROPOSED PARKING AREA

10' WIDE RAIL TRAIL

10' WIDE RAIL TRAIL

BUFFER PLANTINGS

WEST MILL STREET

FLOOD ZONE A

MILL BROOK

MATCH LINE

1

45

47

49

51

53

126 132 134 136 138

N

MASSACHUSETTS COORDINATE SYSTEM

METERS
0 10 25 50 75
0 50 100 200 300
FEET

CONCEPTUAL DESIGN PLAN

BAY COLONY RAIL TRAIL
MEDFIELD SECTION
MEDFIELD, MASSACHUSETTS

Scale: 1"=100' Date: 04/20/2017

B+T JOB NO. 2866.00 B+T PLAN NO. 286600P002A-002

2

COLONIAL ROAD

HARDING STREET

MILL BROOK

FLOOD ZONE A

GRANITE BLOCK BLOCKING INLET

2'x3.5' STONE BOX CULVERT STA.=831+52

RECOMMENDED BARRIER

10' WIDE RAIL TRAIL

ECB

VISUAL BUFFER

STREAM CONNECTION

BEAVER DAM

R.R. CENTERLINE STA.=830+00

R.R. CENTERLINE STA.=820+00

STA.=820+87

MATCH LINE

MATCH LINE

N

MASSACHUSETTS COORDINATE SYSTEM

METERS 0 10 25 50 75

FEET 0 50 100 200 300

CONCEPTUAL DESIGN PLAN

BAY COLONY RAIL TRAIL
MEDFIELD SECTION
MEDFIELD, MASSACHUSETTS

Scale: 1"=100' Date: 04/20/2017

B+T JOB NO. 2866.00 B+T PLAN NO. 286600P002A-003

3

BEALS AND THOMAS, INC.

COLONIAL ROAD

HUTSON RD.

MARLYN RD.

82 78 74 72 70 66 62 58 54 50 46

MATCH LINE

BATTERY BOX STA.=818+82

ACCESS TO STREET

10' WIDE RAIL TRAIL

ECB

VISUAL BUFFER

WHITE FENCE

STOCKADE FENCE

STOCKADE FENCE

PT STA.=805+41.12

WIRE FENCE

MATCH LINE

R.R. CENTERLINE STA.=820+00

AT-GRADE CROSSING STA.=816+80

R.R. CENTERLINE STA.=810+00

VISUAL BUFFER

10' WIDE RAIL TRAIL

SURVEY MONUMENT (R)

MILL BROOK

138 140 142 144 146 148 150 152 154

N

MASSACHUSETTS COORDINATE SYSTEM

METERS
0 10 25 50 75

FEET
0 50 100 200 300

CONCEPTUAL DESIGN PLAN

BAY COLONY RAIL TRAIL
MEDFIELD SECTION
MEDFIELD, MASSACHUSETTS

Scale: 1"=100'

Date: 04/20/2017

B+T JOB NO. 2866.00

B+T PLAN NO. 286600P002A-004

4

BEALS AND THOMAS, INC.

COLONIAL ROAD

FARM ST.

LINE

MATCH

42

38

34

30

22

23

STOCKADE FENCE

NOT FOUND
STA.=798+87

BLACK CHAIN LINK FENCE

VISUAL BUFFER

RECOMMENDED BARRIER

ECB

10' WIDE RAIL TRAIL

STA.=804+01

FILLED IN CATTLE PASS
STA.=803+11

24" CMP
STA.=802+47

R.R. CENTERLINE
STA.=800+00

TEL. BOX
NOT FOUND
STA.=792+80

MILL BROOK

PC
STA.=795+53.57
SURVEY MONUMENT

R.R. CENTERLINE
STA.=790+00

N/F AT&T

MASSACHUSETTS COORDINATE SYSTEM

N

METERS
0 10 25 50 75
0 50 100 200 300
FEET

CONCEPTUAL DESIGN PLAN

BAY COLONY RAIL TRAIL
MEDFIELD SECTION

MEDFIELD, MASSACHUSETTS

Scale: 1"=100'

Date: 04/20/2017

B+T JOB NO. 2866.00

B+T PLAN NO. 286600P002A-005

5

BEALS AND THOMAS, INC.

DRAIN CROSSING
21" METAL(WEST)
2.5'x3' STONE BOX(EAST)
STA.=784+83

RECOMMENDED BARRIER

NOT FOUND
STA.=782+15

N/F AT&T

10' WIDE RAIL TRAIL

ECB

RECOMMENDED BARRIER

R.R. CENTERLINE
STA.=780+00

NOT FOUND
STA.=776+68

VISUAL BUFFER

BATTERY BOX
STA.=774+60

N/F AT&T

10' WIDE RAIL TRAIL

N/F AT&T

FORMER STATION
STA.=787+90

MILL BROOK

MATCH LINE

MATCH LINE

48

MASSACHUSETTS COORDINATE SYSTEM

METERS
0 10 25 50 75
0 50 100 200 300
FEET

CONCEPTUAL DESIGN PLAN

BAY COLONY RAIL TRAIL
MEDFIELD SECTION
MEDFIELD, MASSACHUSETTS

Scale: 1"=100' Date: 04/20/2017

B+T JOB NO. 2866.00 B+T PLAN NO. 286600P002A-006

6

BEALS AND THOMAS, INC.

METERS
0 10 25 50 75
0 50 100 200 300
FEET

CONCEPTUAL DESIGN PLAN

BAY COLONY RAIL TRAIL
MEDFIELD SECTION
MEDFIELD, MASSACHUSETTS

Scale: 1"=100' Date: 04/20/2017

B+T JOB NO. 2866.00 B+T PLAN NO. 286600P002A-007

R.R. CENTERLINE
STA.=840+00

KIOSK

10' WIDE RAIL TRAIL

10' WIDE RAIL TRAIL

PROPOSED
PARKING AREA

x137.0

139.0x

x136.5

x137.0

139.0x

WATER
QUALITY
BASIN

WATER QUALITY SWALE

BUFFER PLANTINGS

136

138

132

134

WEST MILL STREET

45

47

49

51

53

N
MASSACHUSETTS COORDINATE SYSTEM

METERS
0 10 25 40
0 25 50 100 150
FEET

CONCEPTUAL PARKING PLAN

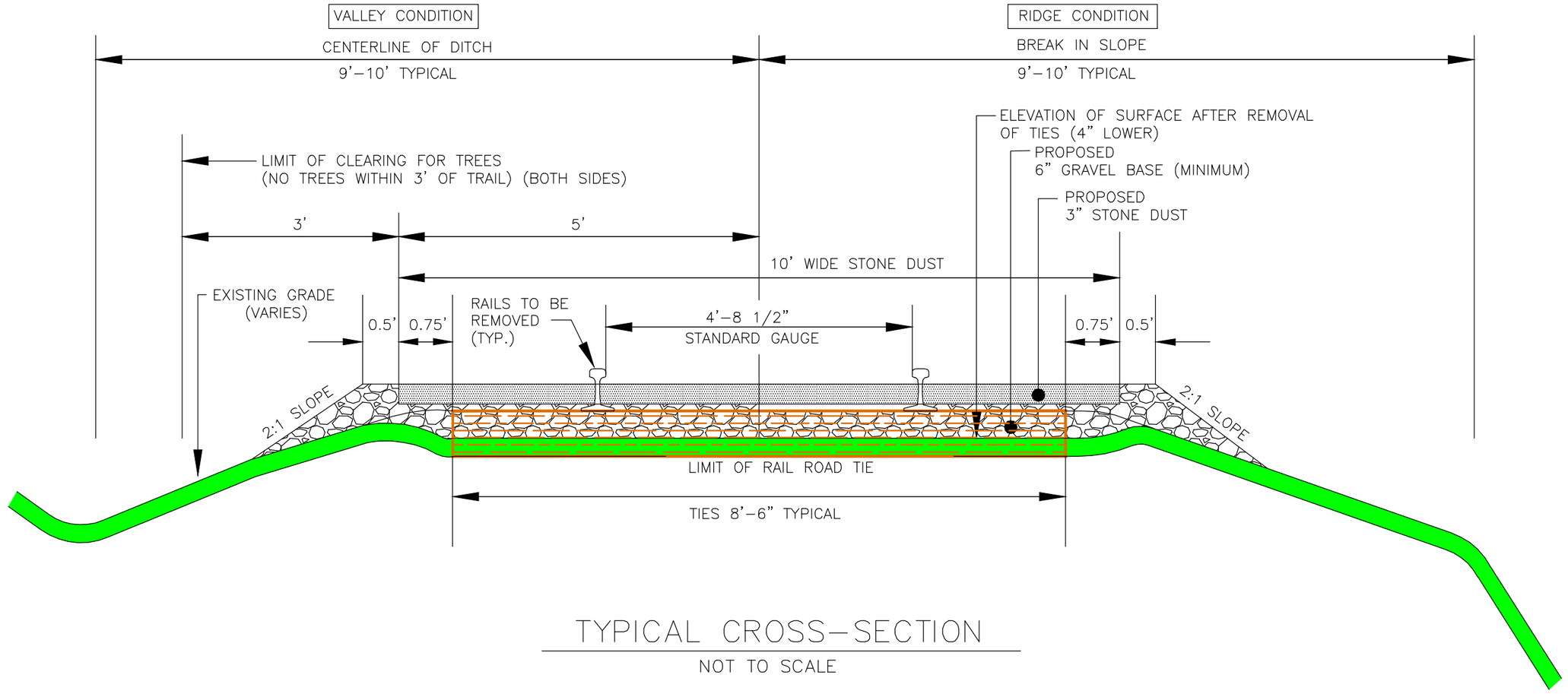
BAY COLONY RAIL TRAIL
MEDFIELD SECTION
MEDFIELD, MASSACHUSETTS

Scale: 1"=50' Date: 04/20/2017

B+T JOB NO. 2866.00 B+T PLAN NO. 286600P002A-008

8

BEALS AND THOMAS, INC.



TYPICAL CROSS–SECTION

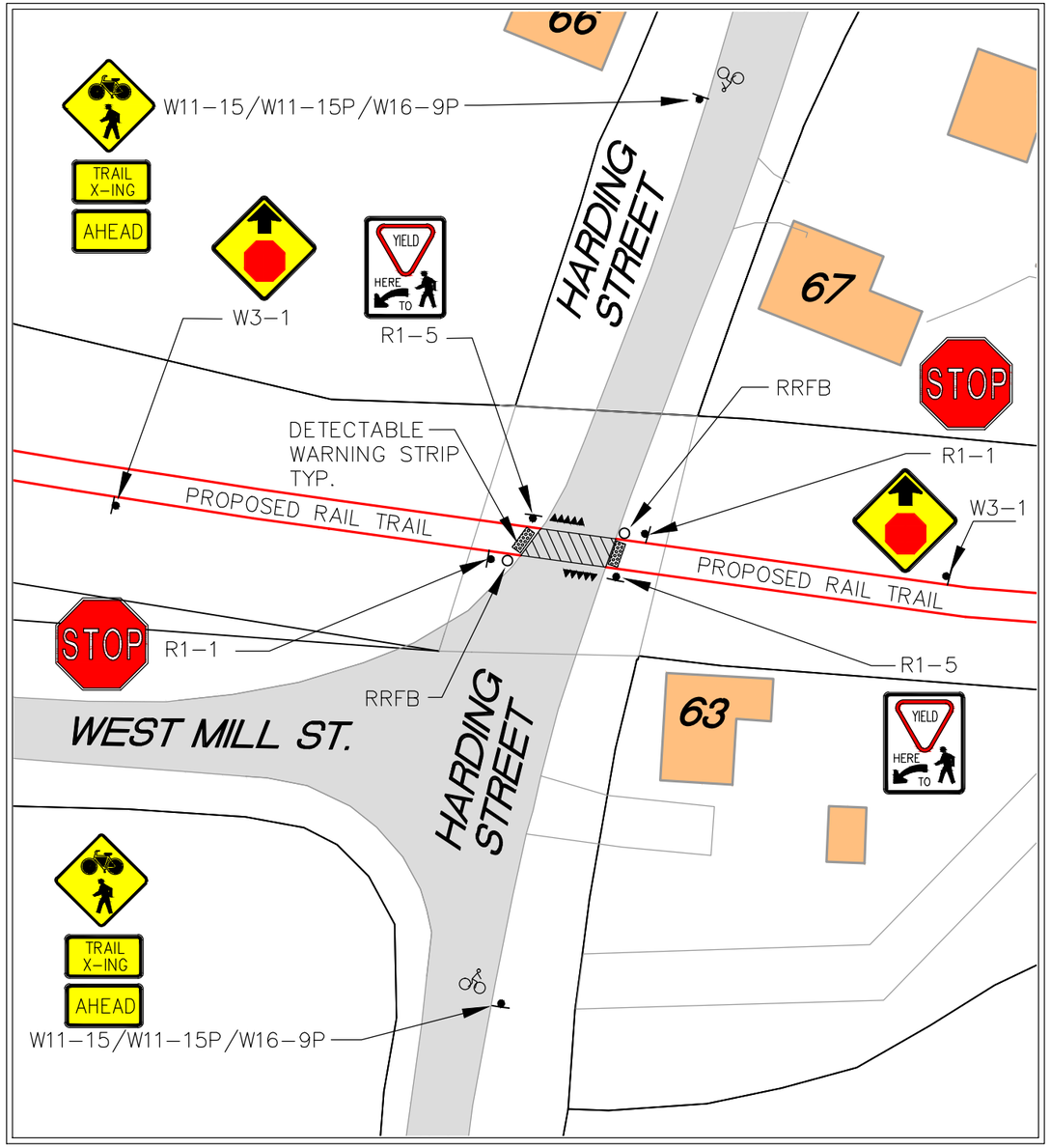
NOT TO SCALE

CROSS SECTION DETAIL

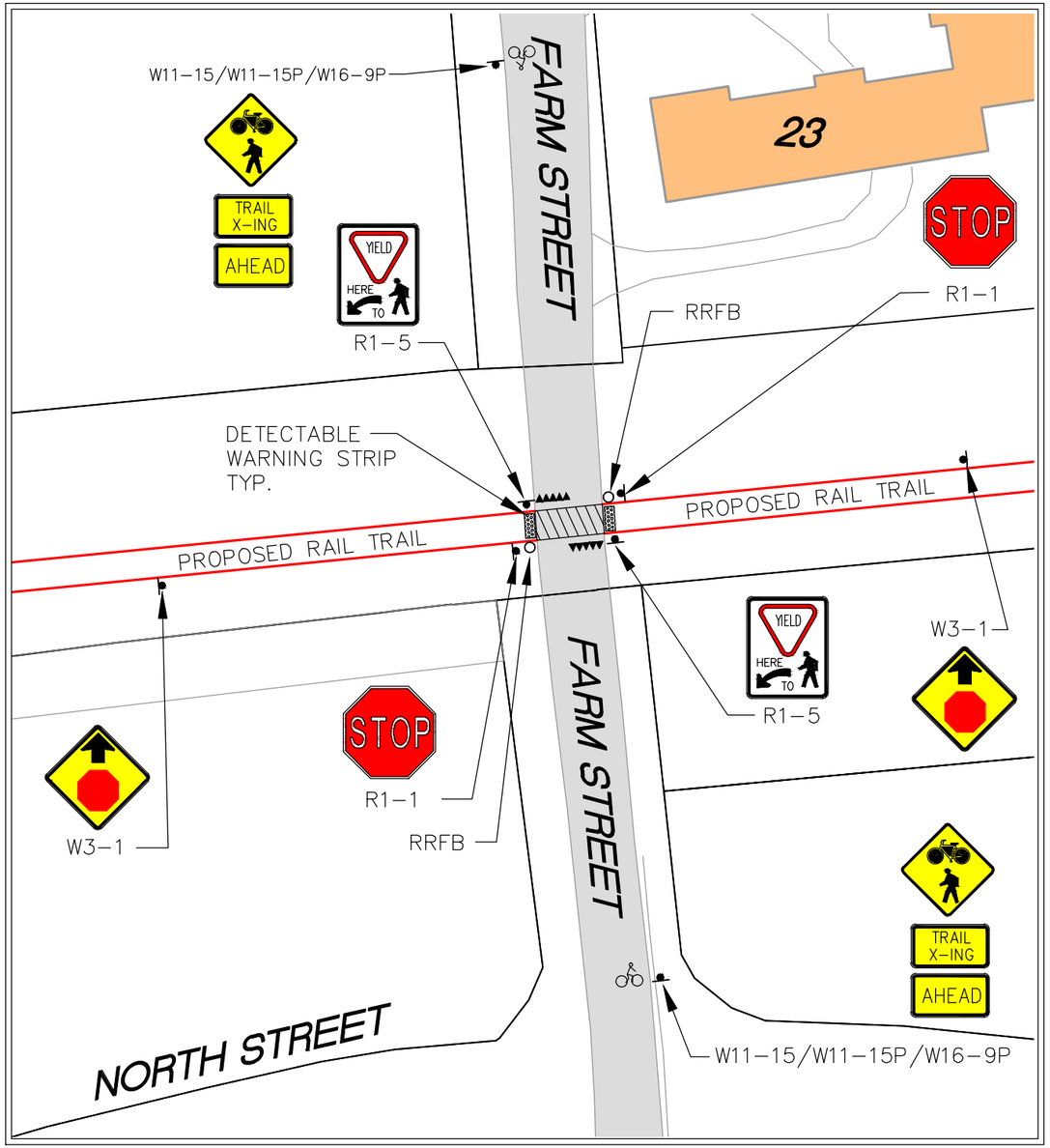
BAY COLONY RAIL TRAIL
MEDFIELD SECTION
MEDFIELD, MASSACHUSETTS

Scale: AS NOTED Date: 04/20/2017

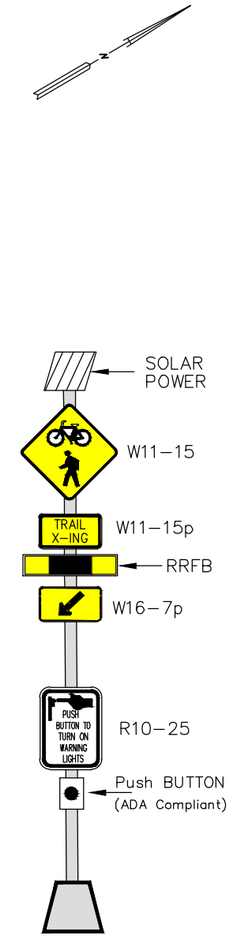
B+T JOB NO. 2866.00 B+T PLAN NO. 286600P003A–001



HARDING STREET CROSSING
NO SCALE



FARM STREET CROSSING
NO SCALE

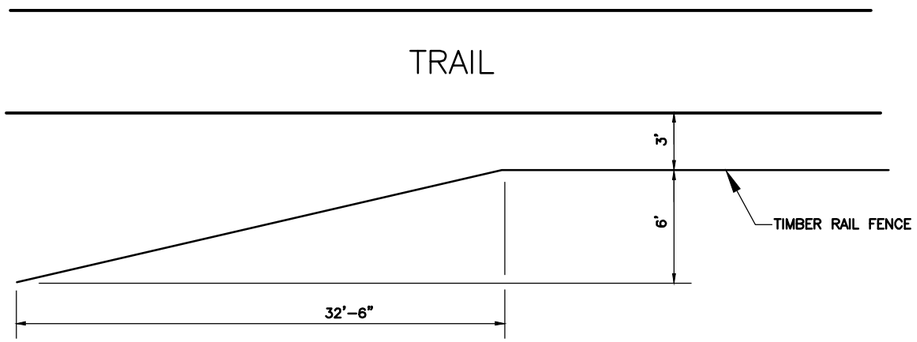


CROSSING DETAILS

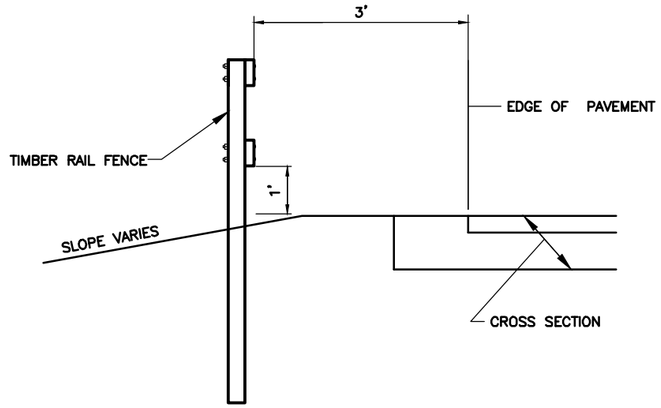
BAY COLONY RAIL TRAIL
MEDFIELD SECTION
MEDFIELD, MASSACHUSETTS

Scale: AS NOTED Date: 04/20/2017

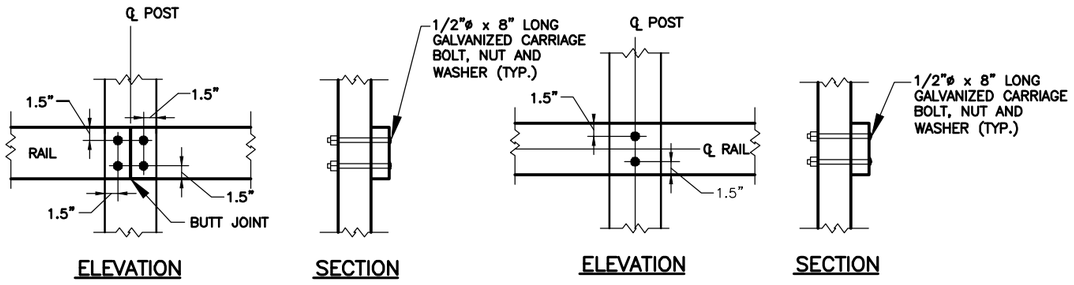
B+T JOB NO. 2866.00 B+T PLAN NO. 286600P003A-002



TYPICAL FENCE TRANSITION
AT FENCE APPROACHES
NOT TO SCALE

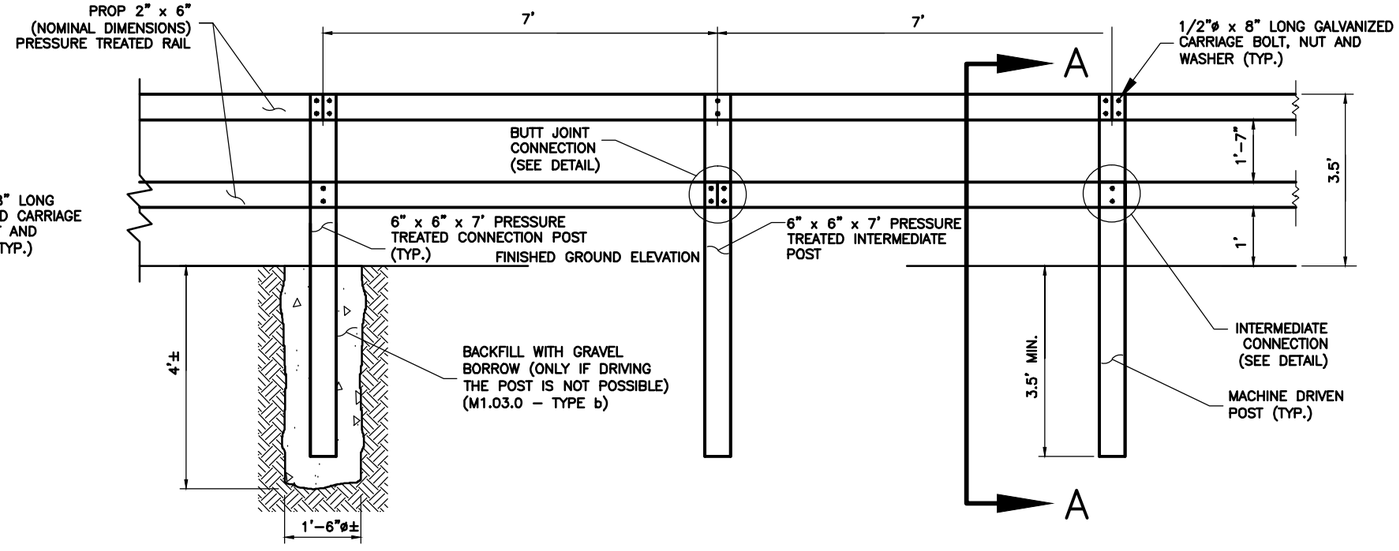


SECTION A–A
NOT TO SCALE



BUTT JOINT CONNECTION
NOT TO SCALE

INTERMEDIATE CONNECTION
NOT TO SCALE



DOUBLE TIMBER RAIL FENCE ELEVATION
NOT TO SCALE
SEE PLANS FOR LOCATIONS

NOTE:
FOR RADII LESS THAN 164', USE CONNECTION POSTS SET AT 7' O.C. AND SHORTEN RAILS ACCORDINGLY.

SUGGESTED DOUBLE TIMBER RAIL FENCE CONSTRUCTION SEQUENCE

1. POSTS SHALL BE MACHINE DRIVEN PROVIDED THAT POSTS ARE NOT DAMAGED IN THE PROCESS. IF REFUSAL IS ENCOUNTERED, POSTS SHALL BE SET PLUMB IN MECHANICALLY EXCAVATED OR CORED HOLES AND SECURED IN GRAVEL BORROW FOOTINGS TO REQUIRED DIMENSIONS.
2. IF IT IS NECESSARY TO MECHANICALLY EXCAVATE OR CORE POST HOLES, THE FOLLOWING WORK SHALL BE COMPLETED:
   A. BACKFILL BOTTOM 6"± OF HOLE WITH GRAVEL AND COMPACT THOROUGHLY.
   B. SET POST AND HOLD PLUMB DURING BACKFILLING.
   C. BACKFILL WITH GRAVEL IN 12" LIFTS. COMPACT EACH LIFT THOROUGHLY.
3. CLAMP RAILS TO POSTS AND FIELD DRILL BOLT HOLES.
4. SET BOLTS, WASHERS AND NUTS.
5. USE ACQ PRESSURE TREATED LUMBER. POSTS SHALL HAVE A PRESERVATIVE RETENTION LEVEL OF 0.60 AND RAILS SHALL HAVE A MINIMUM PRESERVATIVE RETENTION LEVEL OF 0.40.

RAIL FENCE DETAIL

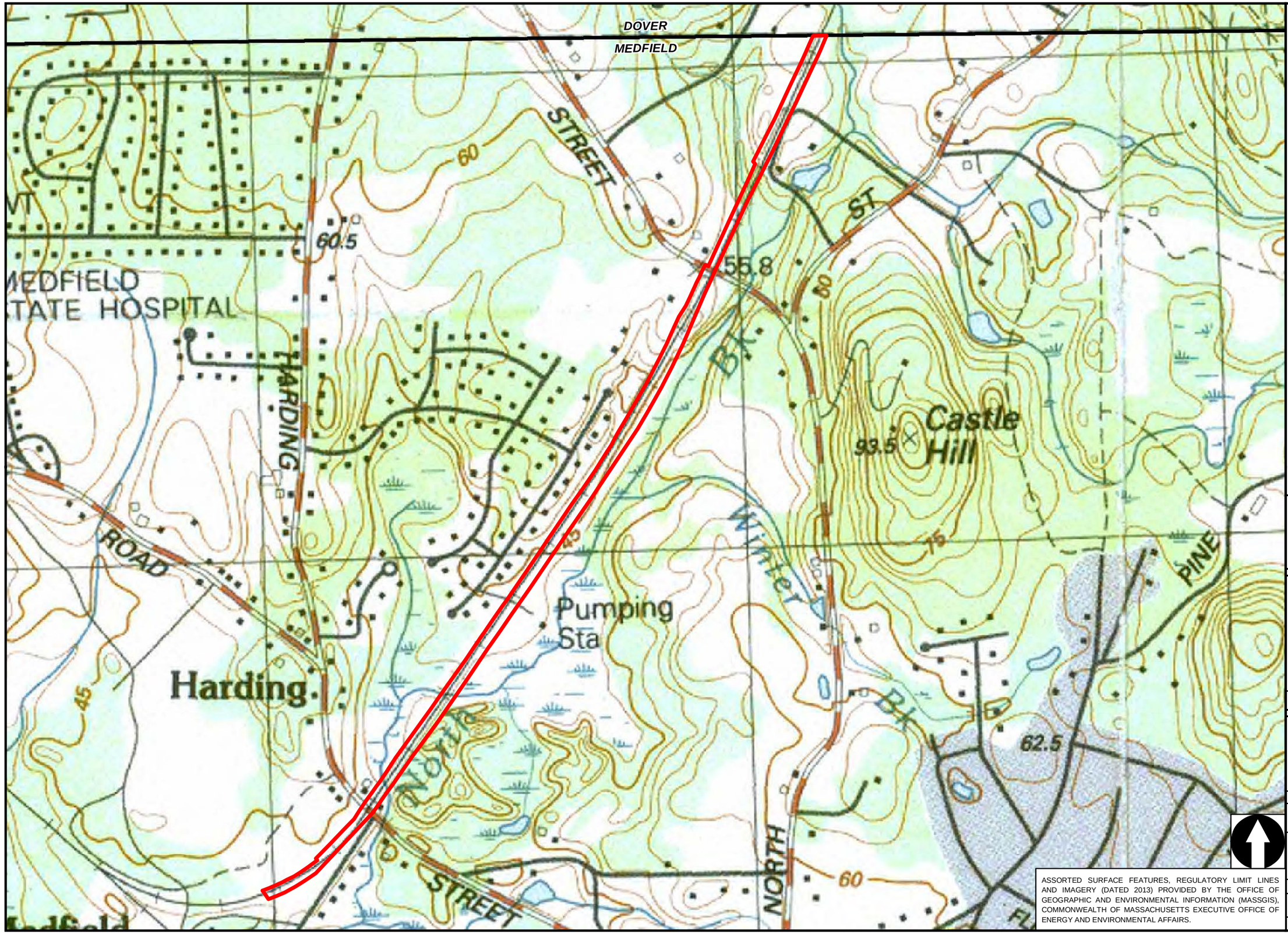
BAY COLONY RAIL TRAIL
MEDFIELD SECTION
MEDFIELD, MASSACHUSETTS

Scale: AS NOTED Date: 04/20/2017

B+T JOB NO. 2866.00 B+T PLAN NO. 286600P003A–003

Appendix B

MassGIS Research



Legend

- Subject Property
- Town Line

PREPARED FOR:

FRIENDS OF MEDFIELD RAIL TRAIL

MEDFIELD, MASSACHUSETTS

PREPARED BY:

B E A L S + T H O M A S
Civil Engineers + Landscape Architects + Land Surveyors + Planners + Environmental Specialists

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144 Turnpike Road
Southborough, Massachusetts 01772
T 508.366.0560 | www.bealsandthomas.com

PROJECT:

BAY COLONY RAIL TRAIL

MEDFIELD, MASSACHUSETTS

SCALE: 1" = 600' DATE: FEBRUARY 23, 2017

0 300 600 900
FEET

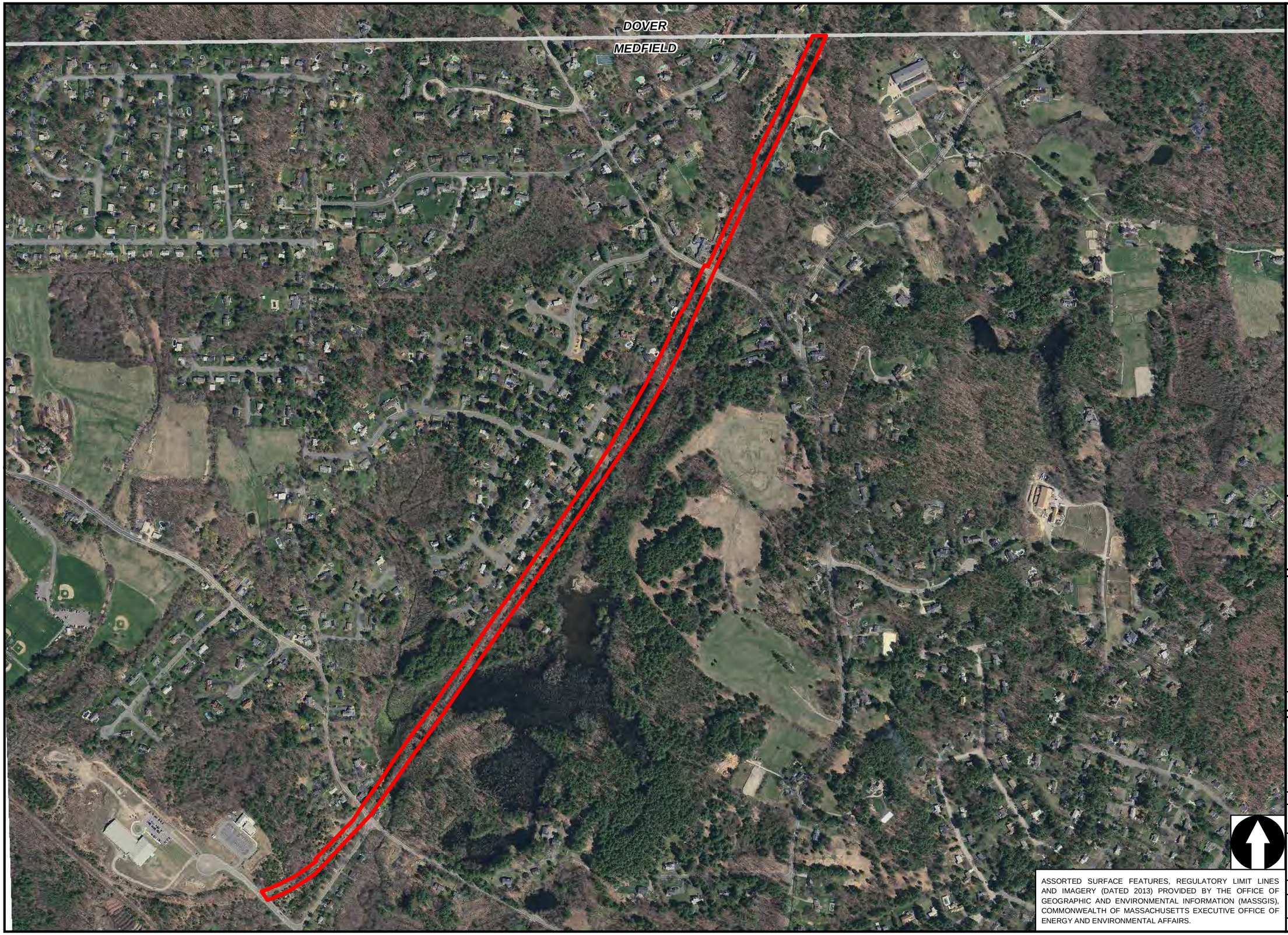
USGS MAP

ASSORTED SURFACE FEATURES, REGULATORY LIMIT LINES AND IMAGERY (DATED 2013) PROVIDED BY THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS.

B+T JOB NO. 2866.00

B+T PLAN NO. 286600P001A-001

FIGURE 1



Legend

- Subject Property
- Town Line

PREPARED FOR:

FRIENDS OF MEDFIELD RAIL TRAIL

MEDFIELD, MASSACHUSETTS

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0 300 600 900
FEET

2013 AERIAL PHOTO

ASSORTED SURFACE FEATURES, REGULATORY LIMIT LINES AND IMAGERY (DATED 2013) PROVIDED BY THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS.

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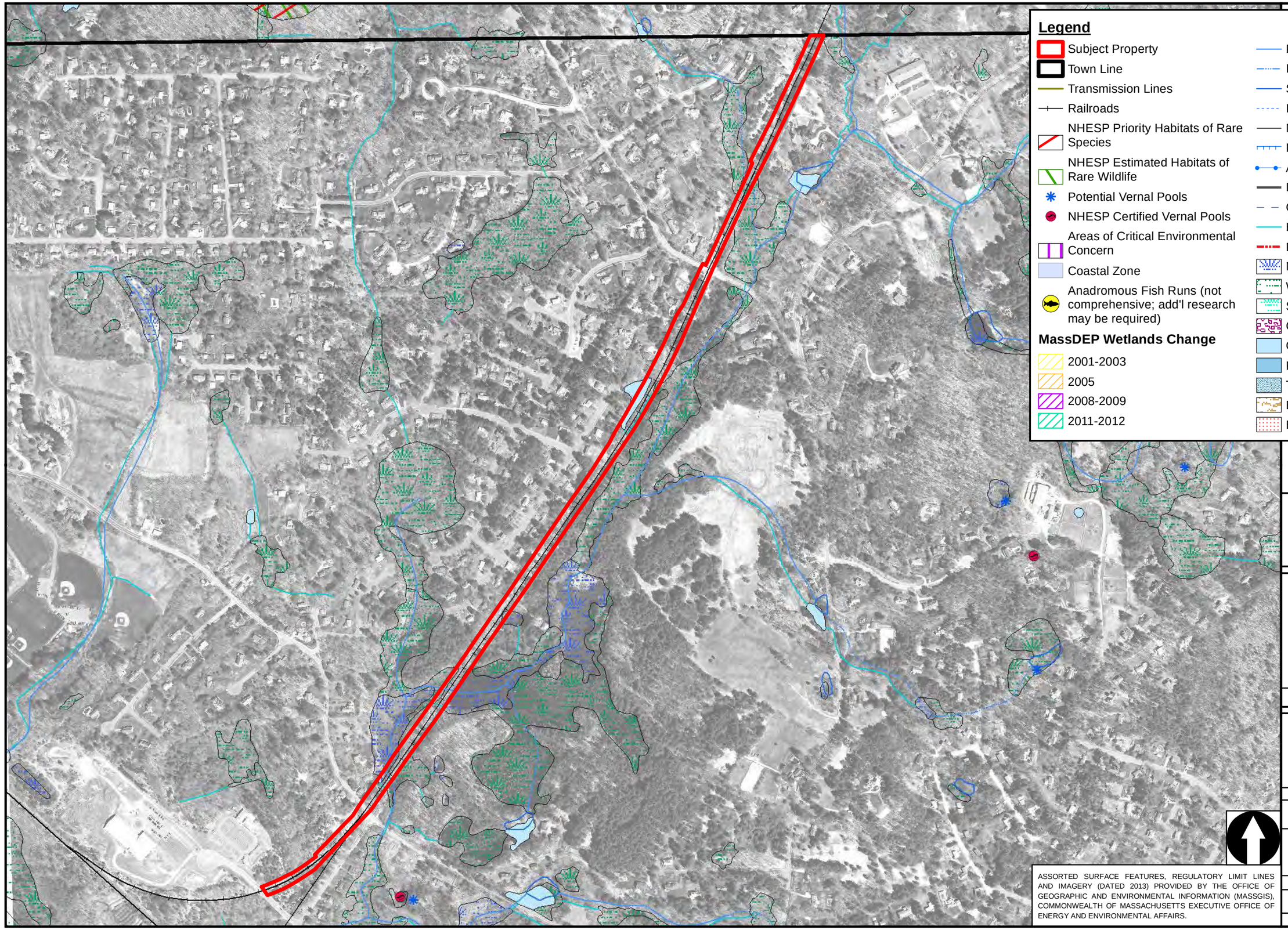
B+T PLAN NO. 286600P001A-002

FIGURE 2



Legend

- Subject Property
- Town Line
- Transmission Lines
- Railroads
- NHESP Priority Habitats of Rare Species
- NHESP Estimated Habitats of Rare Wildlife
- Potential Vernal Pools
- NHESP Certified Vernal Pools
- Areas of Critical Environmental Concern
- Coastal Zone
- Anadromous Fish Runs (not comprehensive; add'l research may be required)

MassDEP Wetlands Change

- 2001-2003
- 2005
- 2008-2009
- 2011-2012

- Perennial Stream
- Intermittent Stream
- Shoreline
- Intermittent Shoreline
- Manmade Shoreline
- Ditch/Canal
- Aqueduct
- Dam
- Channel in Water
- Hydrologic Connections
- Designated Port Areas
- Marsh/Bog
- Wooded marsh
- Salt Marsh
- Cranberry Bog
- Open Water
- Reservoir (with PWSID)
- Tidal Flats
- Beach/Dune
- Barrier Beaches

ASSORTED SURFACE FEATURES, REGULATORY LIMIT LINES AND IMAGERY (DATED 2013) PROVIDED BY THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS.

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MEDFIELD, MASSACHUSETTS

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PROJECT:

BAY COLONY RAIL TRAIL

MEDFIELD, MASSACHUSETTS

SCALE: 1" = 600' DATE: FEBRUARY 23, 2017

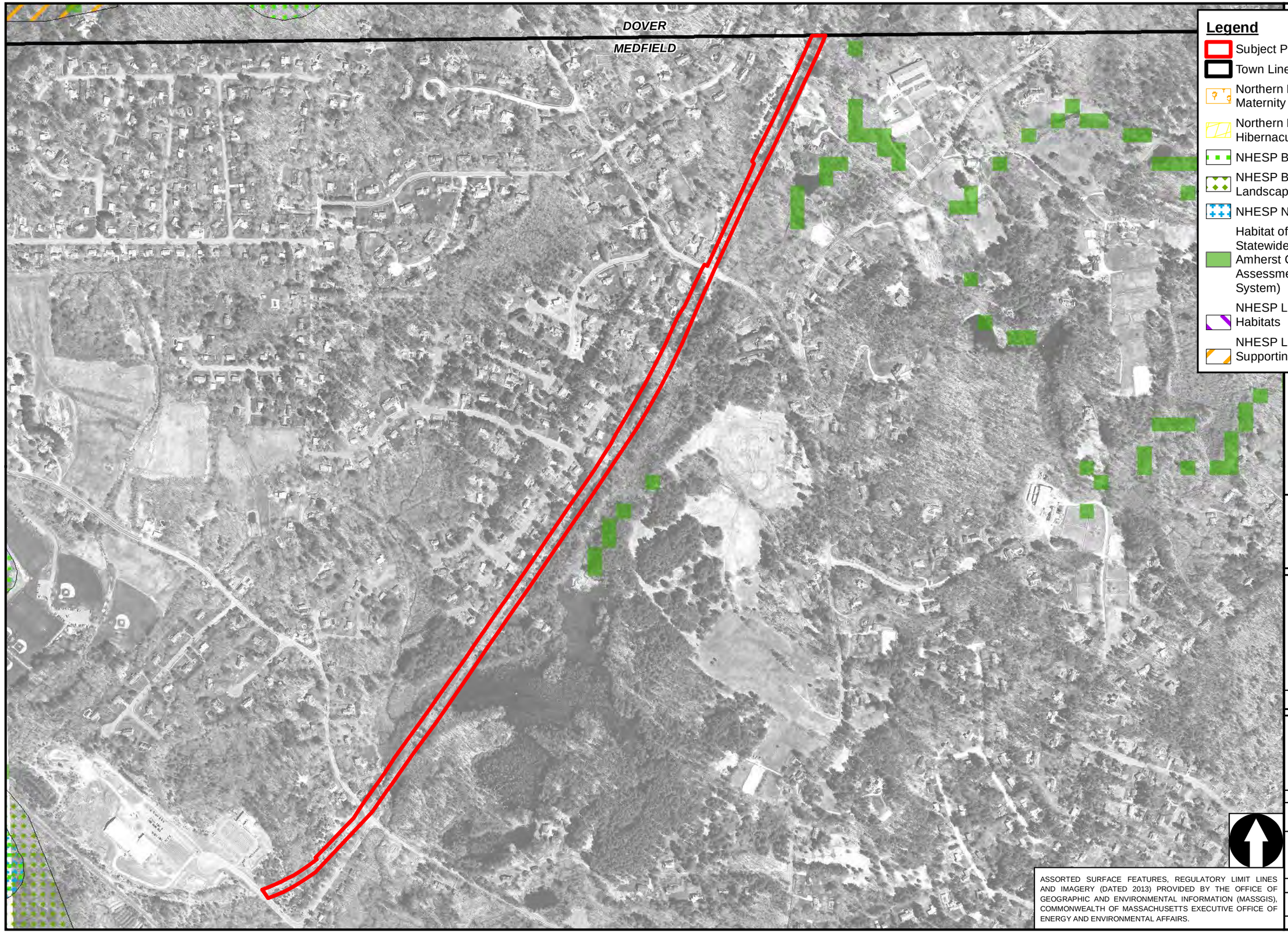
0 300 600 900
FEET

REGULATED AREAS

B+T JOB NO. 2866.00

B+T PLAN NO. 28660DP001A-003

FIGURE 3



Legend

- Subject Property
- Town Line
- Northern Long-eared Bat Maternity Roost Tree Locations
- Northern Long-eared Bat Winter Hibernacula
- NHESP BioMap Core Habitat
- NHESP BioMap Critical Natural Landscape
- NHESP Natural Communities
- Habitat of Potential Regional and Statewide Importance (UMass Amherst Conservation Assessment and Prioritization System)
- NHESP Living Waters Core Habitats
- NHESP Living Waters Critical Supporting Watersheds

ASSORTED SURFACE FEATURES, REGULATORY LIMIT LINES AND IMAGERY (DATED 2013) PROVIDED BY THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS.

PREPARED FOR:

FRIENDS OF MEDFIELD RAIL TRAIL
MEDFIELD, MASSACHUSETTS

PREPARED BY:

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PROJECT:

BAY COLONY RAIL TRAIL
MEDFIELD, MASSACHUSETTS

SCALE: 1" = 600' DATE: FEBRUARY 23, 2017

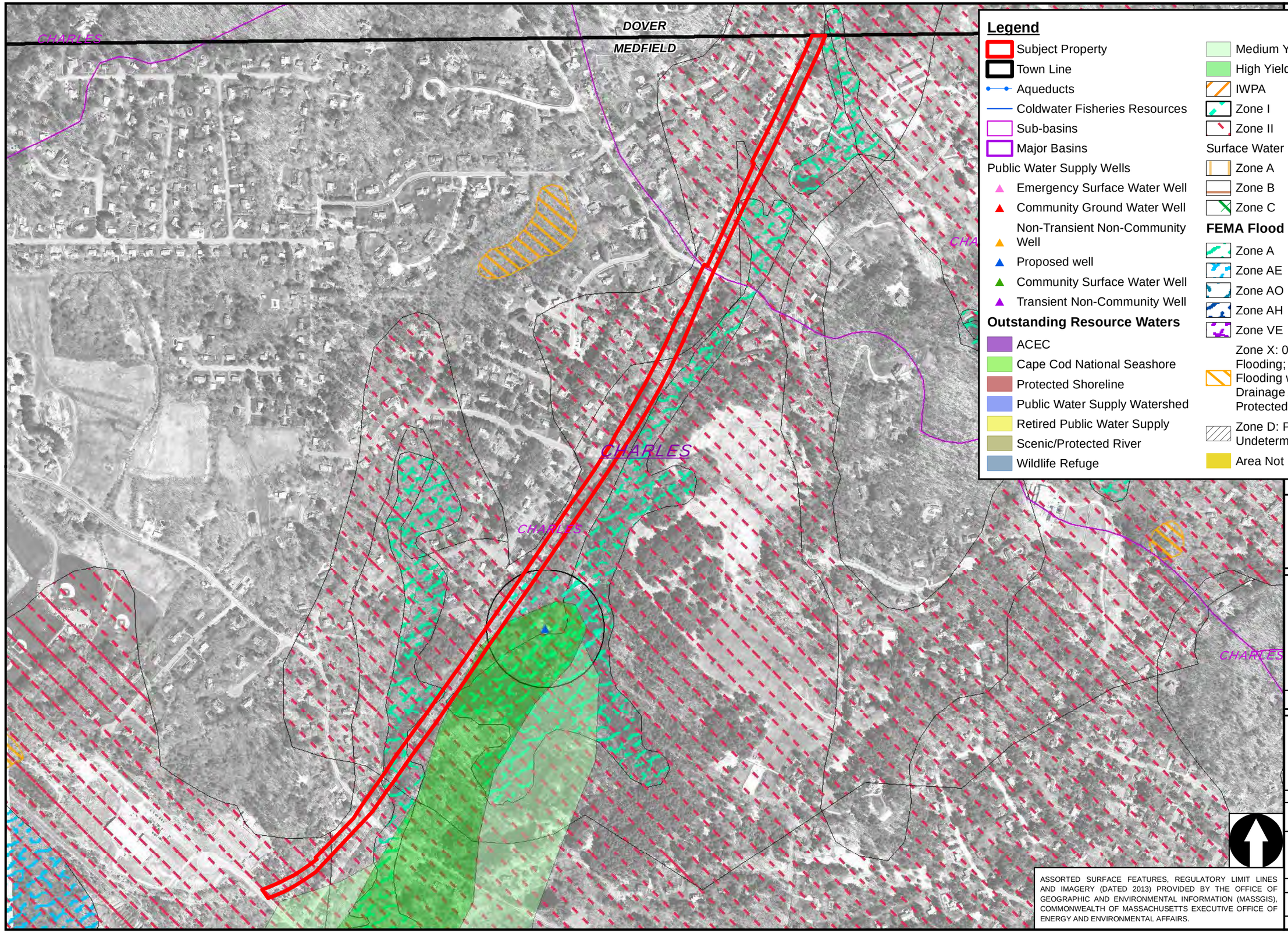
0 300 600 900
FEET

OTHER HABITAT

B+T JOB NO. 2866.00

B+T PLAN NO. 286600P001A-004

FIGURE 4



Legend

- Subject Property
- Town Line
- Aqueducts
- Coldwater Fisheries Resources
- Sub-basins
- Major Basins

Public Water Supply Wells

- Emergency Surface Water Well
- Community Ground Water Well
- Non-Transient Non-Community Well
- Proposed well
- Community Surface Water Well
- Transient Non-Community Well

Outstanding Resource Waters

- ACEC
- Cape Cod National Seashore
- Protected Shoreline
- Public Water Supply Watershed
- Retired Public Water Supply
- Scenic/Protected River
- Wildlife Refuge
- Medium Yield
- High Yield
- IWPA
- Zone I
- Zone II

Surface Water Protection Zones

- Zone A
- Zone B
- Zone C

FEMA Flood Zones

- Zone A
- Zone AE
- Zone AO
- Zone AH
- Zone VE
- Zone X: 0.2% Annual Chance of Flooding; 1% Annual Chance of Flooding w/ Depth <1ft or Drainage Areas <1 sq.mi.; Areas Protected by Levees
- Zone D: Possible But Undetermined Hazard
- Area Not Included

ASSORTED SURFACE FEATURES, REGULATORY LIMIT LINES AND IMAGERY (DATED 2013) PROVIDED BY THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS.

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MEDFIELD, MASSACHUSETTS

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PROJECT:

BAY COLONY RAIL TRAIL

MEDFIELD, MASSACHUSETTS

SCALE: 1" = 600' DATE: FEBRUARY 23, 2017

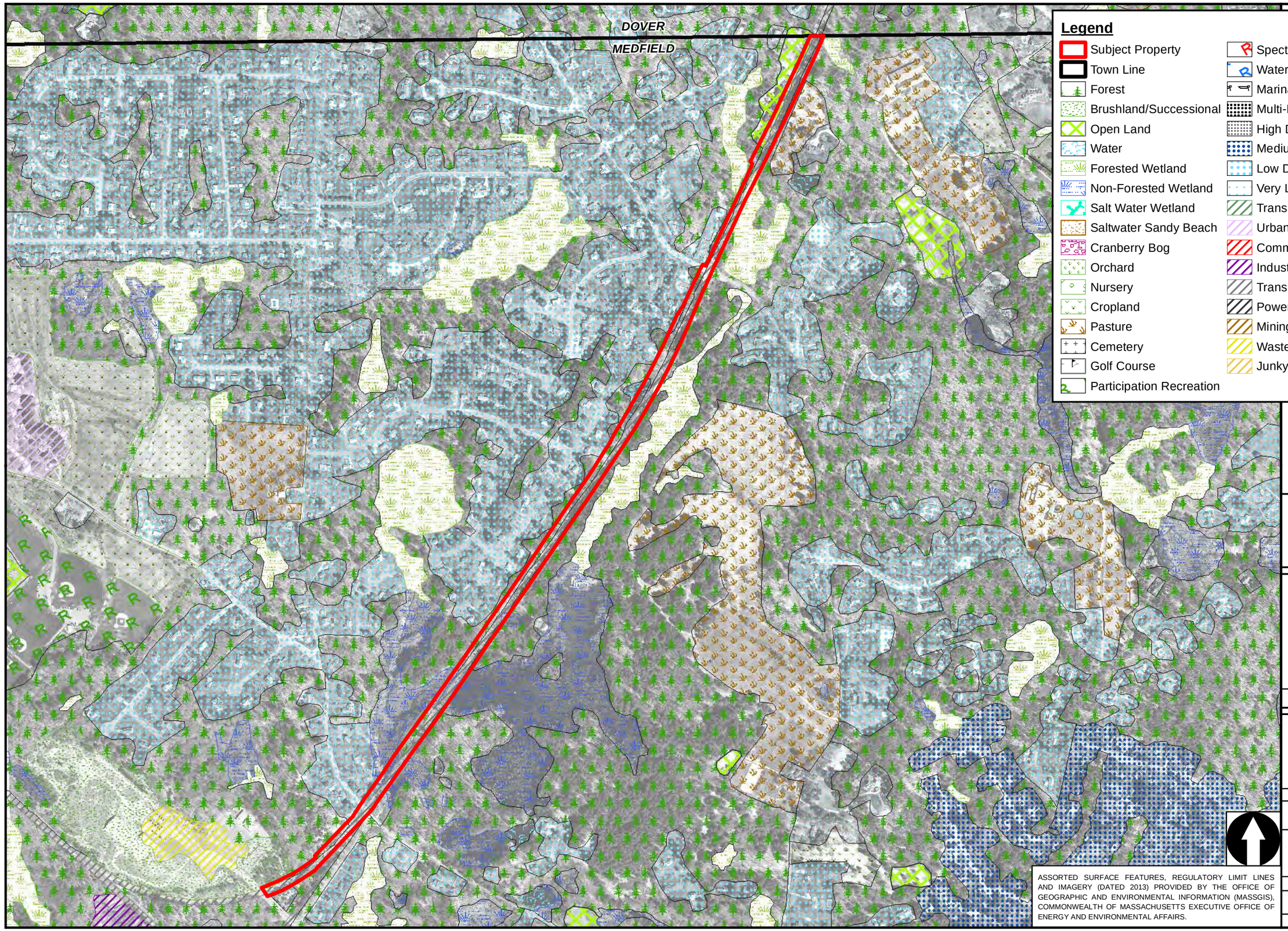
0 300 600 900
FEET

WATER RESOURCES

B+T JOB NO. 2866.00

B+T PLAN NO. 2866OOP001A-005

FIGURE 5



Legend

- Subject Property
- Town Line
- Forest
- Brushland/Successional
- Open Land
- Water
- Forested Wetland
- Non-Forested Wetland
- Salt Water Wetland
- Saltwater Sandy Beach
- Cranberry Bog
- Orchard
- Nursery
- Cropland
- Pasture
- Cemetery
- Golf Course
- Participation Recreation
- Spectator Recreation
- Water-Based Recreation
- Marina
- Multi-Family Residential
- High Density Residential
- Medium Density Residential
- Low Density Residential
- Very Low Density Residential
- Transitional
- Urban Public/Institutional
- Commercial
- Industrial
- Transportation
- Powerline/Utility
- Mining
- Waste Disposal
- Junkyard

ASSORTED SURFACE FEATURES, REGULATORY LIMIT LINES AND IMAGERY (DATED 2013) PROVIDED BY THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS.

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FRIENDS OF MEDFIELD RAIL TRAIL
MEDFIELD, MASSACHUSETTS

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PROJECT:

BAY COLONY RAIL TRAIL
MEDFIELD, MASSACHUSETTS

SCALE: 1" = 600' DATE: FEBRUARY 23, 2017

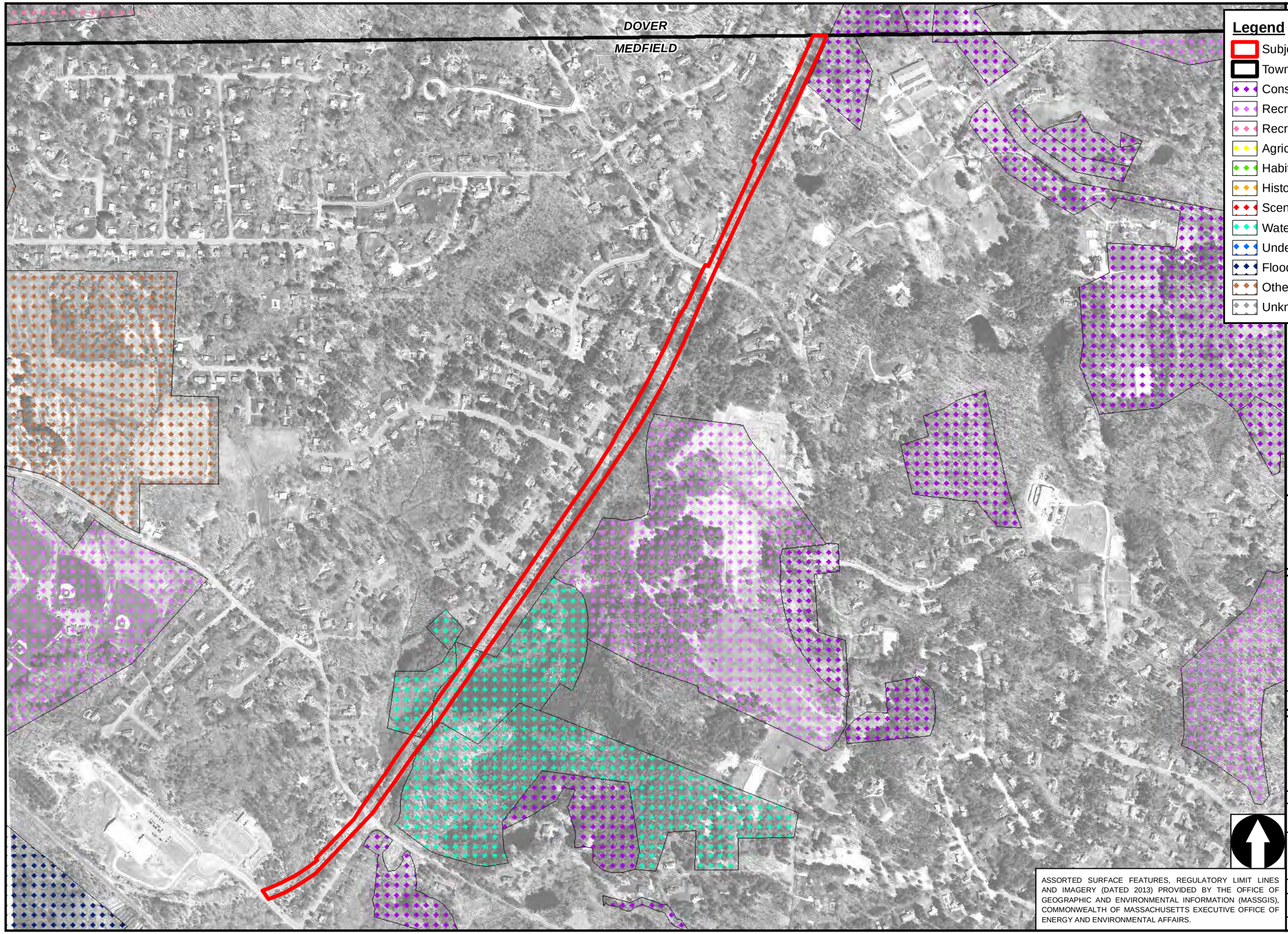
0 300 600 900
FEET

LAND USE

B+T JOB NO. 2866.00

B+T PLAN NO. 286600P001A-006

FIGURE 6



Legend

- Subject Property
- Town Line
- Conservation
- Recreation
- Recreation and Conservation
- Agriculture
- Habitat
- Historical/Cultural
- Scenic
- Water Supply
- Underwater
- Flood Control
- Other
- Unknown

ASSORTED SURFACE FEATURES, REGULATORY LIMIT LINES AND IMAGERY (DATED 2013) PROVIDED BY THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS.

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PROJECT:

BAY COLONY RAIL TRAIL

MEDFIELD, MASSACHUSETTS

SCALE: 1" = 600' DATE: FEBRUARY 23, 2017

0 300 600 900
FEET

OPEN SPACE

B+T JOB NO. 2866.00

B+T PLAN NO. 28660DP001A-007

FIGURE 7

DOVER
MEDFIELD

Legend

- Subject Property
- Town Line
- Soil Type

Prime Farmland Soils

- Prime Farmland
- Farmland of Statewide Importance
- Farmland of Unique Importance
- Sand & Gravel
- Till or Bedrock
- Sandy Till over Sand
- End Moraine
- Large Sand Deposit
- Fine-Grained Deposit
- Floodplain Alluvium

ASSORTED SURFACE FEATURES, REGULATORY LIMIT LINES AND IMAGERY (DATED 2013) PROVIDED BY THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS.

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PROJECT:

BAY COLONY RAIL TRAIL

MEDFIELD, MASSACHUSETTS

SCALE: 1" = 600' DATE: FEBRUARY 23, 2017

0 300 600 900
FEET

SURFICIAL GEOLOGY

B+T JOB NO. 2866.00

B+T PLAN NO. 28660DP001A-008

FIGURE 8

Legend

- Subject Property
- Town Line
- Underground Storage Tanks
- AUL Sites
- BWP Major Facilities

Tier Classified 21E Sites

- Tier I
- Tier II
- Tier ID
- Solid Waste Diversion and Disposal

ASSORTED SURFACE FEATURES, REGULATORY LIMIT LINES AND IMAGERY (DATED 2013) PROVIDED BY THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS.

PREPARED FOR:

FRIENDS OF MEDFIELD RAIL TRAIL

MEDFIELD, MASSACHUSETTS

PREPARED BY:

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PROJECT:

BAY COLONY RAIL TRAIL

MEDFIELD, MASSACHUSETTS

SCALE: 1" = 600' DATE: FEBRUARY 23, 2017

0 300 600 900
FEET

HAZARDOUS MATERIALS

B+T JOB NO. 2866.00

B+T PLAN NO. 286600P001A009

FIGURE 9

Appendix C

Sampling Protocol

Minimum Sampling
For Rails-to-Trails Conversion of Rail Corridors

I. Sampling

Surface soils should be sampled as follows:

a. Adjacent to any existing or former buildings, bridges, signals, etc.

b. At former switch or rail-to-rail crossings, collect a minimum of 3 composite samples. One composite sample should be obtained at the switch or crossing location, with additional composite samples obtained at 50-foot intervals in either directional along the corridor as illustrated in Figure 1. Each composite sample should consist of 5 specimens (i.e., each composite sample will consist of 5 discreet samples that are mixed together and analyzed as a single sample).

c. Along the remaining rail corridor:

- For corridor less than 0.5-mile long, collect a minimum of 10 composite samples.
- For corridor 0.5 – 0.75 miles long, collect 15 composite samples.
- For corridor 0.75 miles to 1 mile long, collect 20 composite samples. Space the sampling points evenly down corridor, i.e., 20 samples in one mile is one sample about every 250 feet.
- For corridors greater than 1 mile in length, the number of evenly spaced samples to be collected should be calculated as follows:

  Number of Composite Samples = 20 + 5x

  Where x = total corridor length in excess of 1 mile

  As an example, given a 4-mile length of corridor, the number of samples to be collected would equal 20+5*3 or 35 composite samples, which would be spaced approximately every 600 feet.

Each composite sample collected along the corridor should consist of 5 specimens.

d. Samples should be collected from the upper 6 inches of soil taking into consideration State standards concerning direct exposure.

e. Samples should be analyzed for arsenic (SW 846 Method 6010B), lead (SW 846 Method 6010B) and PAH (SW 846 Method 8270C SIM). If the corridor was utilized for electric rail, the samples should also be analyzed for PCB's using SW 846 Method 8082, Method 608 or appropriate state test method.

Figure 1. Main Corridor Sampling Protocol

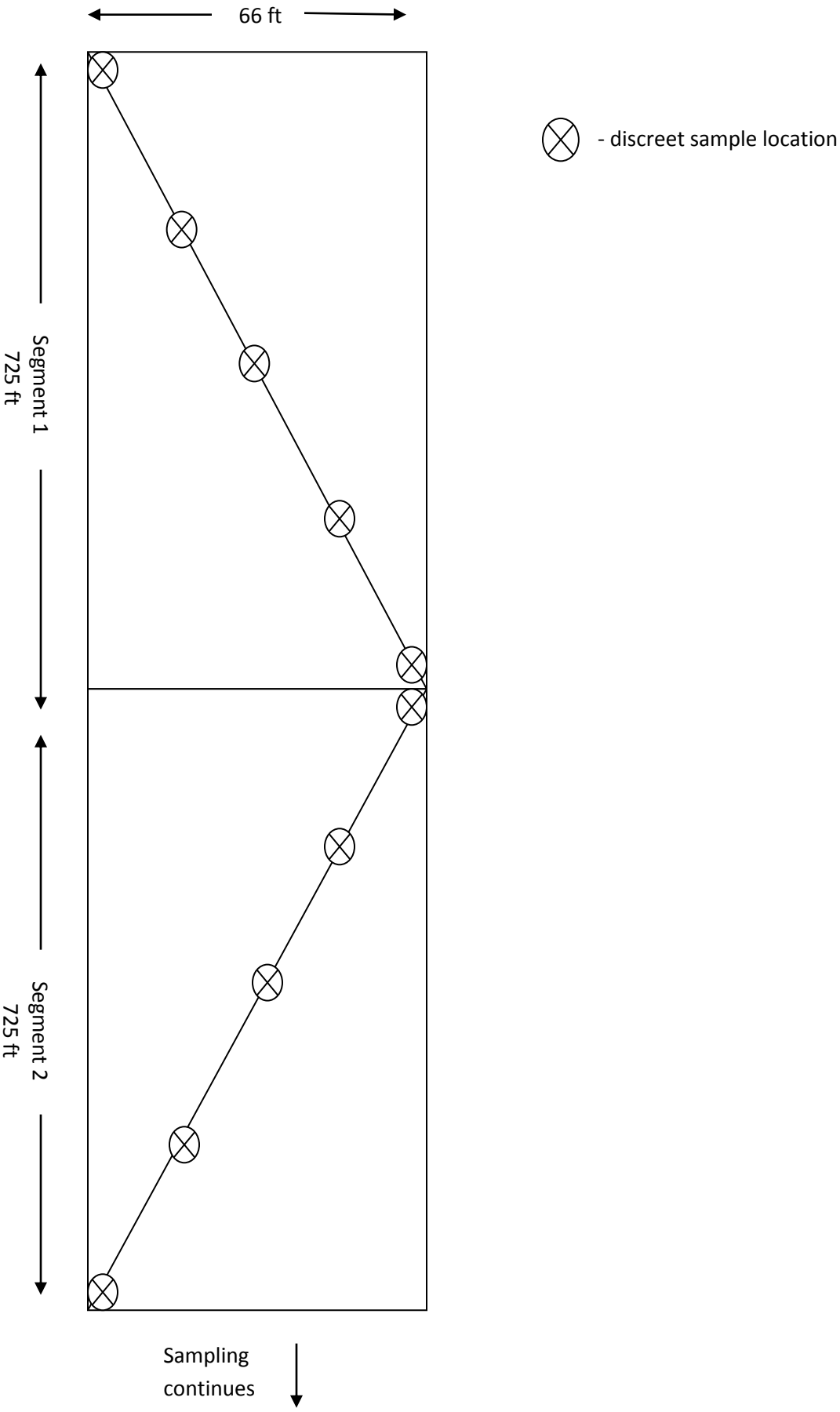
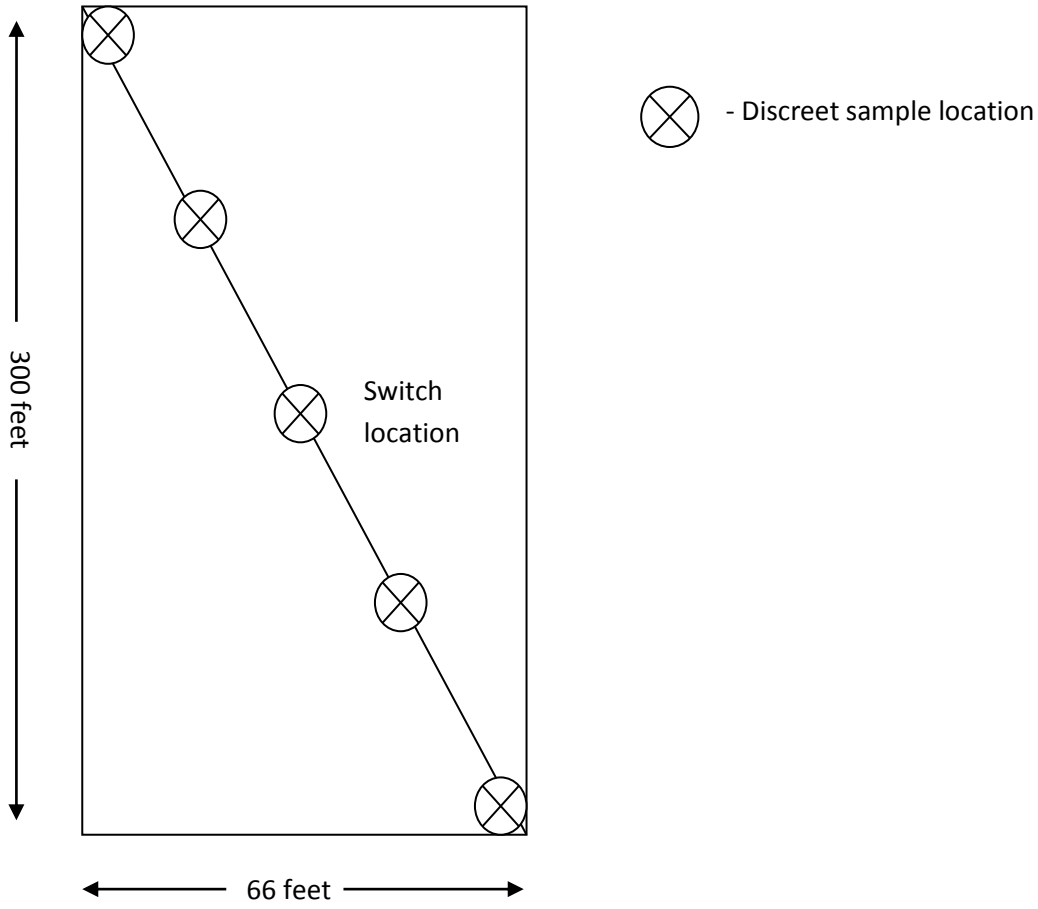


Figure 2. Switch Location Sampling Protocol



Appendix D

Cost Estimate

BEALS+THOMAS

COST ESTIMATE

Bay Colony Rail Trail- Medfield Section

Item No.	Item of Work	Estimated Quantity	Unit of Measure	Unit Price, $	Amount, $	Low-Cost Alternative	Recommended Alternative	High-Cost Alternative	Comment
1	Soft Cost- Legal Services for MBTA lease	1	Lump Sum	0	0	$ 6,000	$ 6,000	$ 8,000	Town counsel at relatively low costs for legal services
2	Soft Cost- Topographic Base Survey	1	Lump Sum	0	0	$ 15,000	$ 15,000	$ 30,000	Low- available topo, limited survey, High- 30 ft corridor survey
3	Soft Costs- Design and MBTA approvals	1	Lump Sum	0	0	$ 65,000	$ 65,000	$ 65,000	Assumes one phase of design
4	Soft Costs- Permitting Local	1	Lump Sum			$ 5,000	$ 5,000	$ 14,000	Low cost- RDA, High Cost NOI, SP,
5	Soft Costs- SWPPP	1	Lump Sum			$ 2,000	$ 2,000	$ 2,000	
6	Soft Cost - Environmental Testing	1	Lump Sum			$ -	$ 15,000	$ 15,000	Low- No testing
7	Soft Cost- MBTA Indemnification/ Environmental Insurance	1	Lump Sum			$ -	$ -	$ 50,000	Low- Town indemnifies MBTA, High- Insurance
8	Soft Cost - Construction Administration/ Permitting Oversight	1	Lump Sum			$ 15,000	$ 15,000	$ 24,000	
9	Soft Cost- As-built Plan	1	Lump Sum			$ 14,000	$ 14,000	$ 14,000	Required by MBTA
10	Clearing and Grubbing	2.2	Acres	7,605		$ -	$ -	$ 14,000	Low- volunteer clearing, High- fully contracted
11	Rail and tie removal (cost dependent on current value of steel)	1	Lump Sum			$ 30,000	$ 30,000	$ 60,000	Depends on value of steel at time of construction
12	Erosion Control	3,230	Linear Feet	2	6,815	$ 3,000	$ 3,000	$ 9,000	Low- Reduced ECB, High- Full ECB
13	Culvert Cleanout	1	Lump Sum	1,500		$ 1,600	$ 1,600	$ 2,500	Low, volunteer debris removal for one drain, High- all contracted services
14	Physical Barriers	2,500	Linear Feet			$ 45,000	$ 45,000	$ 90,000	Low- reduced barrier, High- Full barrier
15	Visual Buffer	2,530	Linear Feet			$ 25,000	$ 25,000	$ 50,000	Low- volunteer
16	Gravel Base- material, install, grading and compacting	1.3	Cost per mile			$ 90,000	$ 90,000	$ 112,000	Low and preferred is reduced 15% of high due to donated materials, but labor is same
17	Stone Dust- material, install, grading and compacting	1.3	Cost per mile			$ 40,000	$ 40,000	$ 40,000	
18	At-grade Crossing with flashing beacons (two)	1	Lump Sum	20,000	20,000	$ 64,000	$ 64,000	$ 64,000	
19	Parking Area	1	Lump Sum			$ 60,000	$ 60,000	$ 85,000	Low- gravel surface except HC, Full- paved
21	Access Path Signage	1	Lump Sum			$ 500	$ 500	$ 1,500	
22	Maintenance Account (10 year)	1	Lump Sum			$ 15,000	$ 15,000	$ 15,000	
23	Amenities (kiosks, interpretive signage, MBTA-required prevention signs)	1	Lump Sum	0	0	$ 4,000	$ 4,000	$ 6,000	
24	Performance Bonds	1	Lump Sum	0	0	$ 15,000	$ 15,000	$ 15,000	Required by MBTA
25	Subtotal					$ 515,100	$ 530,100	$ 786,000	
26	Contingency (20%)					$ 103,020	$ 106,020	$ 157,200	
27	Total					$ 618,120	$ 636,120	$ 943,200	